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On the Relation of the Price of Wheat to the Revenue.
Communicated by DR. GUY.

[Read before the Statistical Society of London, 20th December, 1852.]

It must be in the recollection of many members of this Society that, at the last meeting of last session, when I had the honour of communicating a paper, "On the Effect of the Remission of Taxes on the Revenue, in the Thirty Years, from 1822 to 1851 inclusive," the late Mr. Porter, in the very last observations he addressed to the Society, took occasion to connect the state of the revenue, at different periods, with the price of wheat; attributing the flourishing condition of our finances, and the successful result of a remission of duties, to the low price of this prime necessary of life, and the opposite state of things to its high price. As I was not then prepared to contest the soundness of Mr. Porter's opinion, and the Society seemed disposed to bow to his authority, his statement did not provoke discussion. As, however, I had occasion, after the meeting, to express to Mr. Porter my private opinion that a careful joint analysis of the revenue and the price of wheat would scarcely bear out the opinion he had expressed, it was with more than usual interest that I took the necessary measures to bring that opinion to the test of facts. In laying the result of my examination before the Society, I feel that the reference I have just made to the opinion of our late esteemed and lamented Treasurer, will invest the subject with unusual interest. The numerical results which called forth the comments of Mr. Porter, are embodied in the first of the following tables, which represents, for various intervals of time, the gain or loss accruing to the nation from the financial operations of the last thirty years,—such gain or loss being computed from the state of the revenue in the first and last years of the several series, combined with the balance of taxes repealed or newly imposed, with corrections for increase of population.

The facts comprised in this table do, to a certain extent, warrant the opinion that there is some connection between a low price of wheat and a flourishing state of the public finances; for in each of the two quinquennial periods, (1827 to 1831, and 1837 to 1841,) characterised by the want of success attending our financial operations, the price of wheat was higher than in any other of the six quinquennial periods. But, on the other hand, though the four quinquennial periods, characterised by successful financial operations, were also periods of comparatively low prices of wheat, the greatest success attended the two periods when the price of wheat was highest. Again, of the three decennial periods, the least successful (from 1832 to 1841) was not the period of the highest price of wheat, though the most favourable financial results did certainly coincide with the lowest average price. Lastly, though the price of wheat in the first and last period of fifteen years differed by only nine-pence, nevertheless the period of the most successful financial operations coincides with the highest of the two averages.

TABLE I.

	Gain or Loss to the Nation.	Average Price of Wheat.*
<i>Periods of Five Years.</i>		
<i>Years.</i>		
1822 to 1826	4,835,764 gain	56 1
1827 , , 1831	2,572,840 loss	62 10
1832 , , 1836	3,370,119 gain	49 1
1837 , , 1841	2,478,722 loss	64 4
1842 , , 1846	5,885,225 gain	52 10
1847 , , 1851	2,241,932 gain	48 8
<i>Periods of Ten Years.</i>		
1822 to 1831	1,913,697 gain	59 5
1832 , , 1841	1,545,015 loss	56 9
1842 , , 1851	6,796,150 gain	50 9
<i>Periods of Fifteen Years.</i>		
1822 to 1836	5,346,659 gain	56 0
1837 , , 1851	3,161,001 gain	55 3
<i>Period of Thirty Years.</i>		
1822 to 1851	1,480,398 gain	55 7

* The average prices of wheat, down to 1845, are taken from the Parliamentary Return, 262, as are also the amount of duty received on wheat and wheat-flour from 1825 down to the same date. The price and revenue from this source for later periods, and the other figures employed in this paper, are also taken from Parliamentary Returns. It is necessary to state this, as some of the tables recently published do not correspond with the Parliamentary Returns.

These facts will, perhaps, be better appreciated if the figures for the quinquennial and decennial periods are arranged in a tabular form, in the order of the greatness of the financial results, but omitting the details of the gain or loss to the revenue.

TABLE II.

Successful Financial Periods.	Price of Wheat.	Unsuccessful Financial Periods.	Price of Wheat.
	s. d.		s. d.
1842 to 1846	52 10	1827 to 1831	62 10
1822 , , 1826	56 1	1837 , , 1841	64 4
1832 , , 1836	49 1
1847 , , 1851	48 8
1842 , , 1851	50 9	1832 , , 1841	56 9
1822 , , 1831	59 5

From this table it is evident that there is no exact correspondence between successful or unsuccessful financial results and the price of

wheat; for the quinquennial period which is characterised by the most successful financial operations, is one in which the average price of wheat was as high as 52*s. 10d.*, while the lowest average prices are seen to coincide with the two least successful of the four successful quinquennial periods. An exact coincidence between a successful result on the one hand, and a low price of wheat on the other, could only be brought about by first transposing the first two quinquennial periods, and then inverting the table thus modified. In the three decennial periods there is also, as already stated, a want of exact correspondence between the price of wheat and the degree of success attending our financial operations.

On the whole, there is in these tabular results just such a general coincidence between successful financial operations and a low price of wheat as must serve to provoke to farther inquiry, and to encourage a still more searching analysis.

The first inquiry which naturally suggests itself is, whether, setting aside, all fiscal alterations affecting the revenue, and disregarding increase of population, there is or is not any coincidence between the amount of the revenue and the price of wheat. The elements for this inquiry are comprised in the following table, in which, for convenience sake, the years are arranged in the order of the price of wheat, beginning with the year of highest average price.

TABLE III.

Years.	Price of Wheat.	Ordinary Revenue.	Years.	Price of Wheat.	Ordinary Revenue.
	s. d.	£		s. d.	£
1839.....	70 8	47,688,910	1837.....	55 10	46,199,190
1847.....	69 9	51,340,801	1846.....	54 8	52,950,202
1825.....	66 6	52,065,390	1833.....	52 11	46,170,600
1831.....	66 4	46,293,646	1823.....	51 9	51,508,376
1840.....	66 4	47,351,563	1844.....	51 3	53,317,092
1829.....	66 3	50,428,275	1845.....	50 10	51,719,118
1838.....	64 7	47,104,745	1848.....	50 6	52,422,338
1841.....	64 4	47,917,521	1843.....	50 1	51,069,978
1830.....	64 3	49,889,994	1836.....	48 6	48,591,180
1824.....	62 0	52,202,018	1834.....	46 2	46,425,263
1828.....	60 5	51,665,077	1849.....	44 3	52,310,768
1832.....	58 8	46,833,796	1822.....	43 3	53,652,473
1842.....	57 3	46,700,890	1850.....	40 3	52,177,141
1826.....	56 11	49,625,485	1835.....	39 4	45,893,369
1827.....	56 9	49,581,576	1851.....	38 5	51,669,553

The most cursory inspection of this table will serve to render it highly probable that the years of largest revenue are, taken one with another, also the years of low prices of wheat; for while only five out of the fifteen years of highest prices exhibit a revenue exceeding fifty millions, no less than ten of the fifteen years of lowest prices belong to that category. In order, however, to place this difference in a still clearer light, the following table has been prepared. It shows the average price of wheat and the mean revenue, in several groups of dear and cheap years, and the difference in the two sets of averages. The single exception to the rule is marked by an asterisk.

TABLE IV.

Number of Years.	Dear Years.			Cheap Years.		Average Difference in favour of cheap years.
	Average Price of Wheat.	Average Ordinary Revenue.	Average Price of Wheat.	Average Ordinary Revenue.		
15	s. d.	£	s. d.	£		£
63 5	49,112,646		47 10	50,405,109		1,392,463
65 0	49,231,811		46 5	50,896,388		1,654,577
66 1	49,228,286		45 2	50,593,118		1,364,832
67 2	48,896,190		42 11	50,102,821		1,206,631
67 11	48,948,062		41 1	51,140,661		2,192,599
69 0	50,365,034		39 4	49,913,355		451,679*

This table exhibits results more uniform than might have been expected. In no less than five out of the six groups of years submitted to comparison, the favourable influence of a low price of wheat on the revenue is strikingly apparent; and it is only when the comparison is made between groups of years so small as to give large scope for the play of coincidences, that an opposite result is arrived at. But even in this case, the difference of the revenue in the two triennial groups (less than half a million) is considerably less than the smallest difference (nearly a million and a quarter) in the opposite direction.

It will, perhaps, naturally be suggested that the influence of a low price of wheat is likely to be shown, not in the revenue of the year of low price, but in that of the year following. I have, therefore, proceeded to arrange the facts contained in Table III., in such a manner as to test the value of this suggestion. The results are given in the following table, in which, from the necessity of the case, the groups of fourteen years are substituted for those of fifteen years, the other groups remaining unchanged.

TABLE V.

Number of Years.	Dear Years.		Cheap Years.		Difference in Price of Wheat.	Annual Excess of Ordinary Revenue in Cheap Years.	Annual Excess of Ordinary Revenue in Cheap Years per shilling of Price.
	Average Price of Wheat.	Average Ordinary Revenue.	Average Price of Wheat.	Average Ordinary Revenue.			
14	s. d.	£	s. d.	£	s. d.	£	£
63 10	48,859,997		48 6	50,348,868	15 4	1,488,871	99,258
65 0	48,615,701		47 5	50,536,550	17 7	1,920,849	106,714
66 1	48,678,953		46 5	50,781,132	19 8	2,102,179	105,109
67 2	48,818,515		44 7	50,118,748	22 7	1,300,233	56,532
67 11	48,830,140		42 8	50,262,990	25 3	1,432,850	57,314
69 0	49,799,795		40 11	50,589,703	28 1	789,908	28,211

This substitution of the year following a high or low price for the year coinciding with it, justifies the wisdom of the suggestion which

the foregoing table was intended to test ; for, it will be observed, that, when compared with Table IV., all the averages, with the exception of the average of five years, show an increased difference between the revenues of dear and cheap years, while the average of three years follows the rule to which the average of the same small number of years in Table IV. formed an exception. So that in the table we are now examining every average, from fourteen down to three years, exhibits an increase of revenue coincident with a fall in the price of wheat. The greatest difference is in the average of ten years, where it amounts to 2,102,179*l.* ; the least difference in the average of three years, where it amounts to 789,908*l.* The greatest difference per annum per shilling of price is in the average of twelve years, where it amounts to 106,714*l.* ; the least difference per shilling of price is in the average of three years, where it amounts to 28,211*l.*

Such being the result of a comparison of dear and cheap years, it may be interesting to inquire whether the converse of the proposition established in Table IV. holds good. As the groups of years of lowest price are, with one exception, the groups of years of highest revenue, are the years of highest revenue the years of lowest price ? In order to answer this question, I have arranged in two columns the years in which the revenue was above and below fifty millions. It happens that of the whole series of thirty years, fifteen belong to the one class, and fifteen to the other. The following are the averages obtained :—

TABLE VI.

15 Years above 50 Millions.		15 Years below 50 Millions.		Difference.
Price of Wheat.	Ordinary Revenue.	Price of Wheat.	Ordinary Revenue.	
s. d.	£	s. d.	£	£
53 4	52,033,240	57 11	47,484,515	4,548,725

An average difference of upwards of four and a half millions of revenue in favour of the lower average price of wheat is the answer which this table returns to the question just proposed. What answer it receives when smaller numbers of years are grouped together will be seen in the following table.

TABLE VII.

Number of Years.	Average Ordinary Revenue.		Average Price of Wheat.	
		£	s. d.	s. d.
2	above 53 millions	53,484,782	47 3	
6	52 and less than 53 millions	52,354,643	53 1	52 5
6	51 , , , , ,	51,495,484	53 6	
1	50 , , , , ,	50,428,275	66 3	
3	49 , , , , ,	49,699,018	59 4	58 7
1	48 , , , , ,	48,591,180	48 6	
4	47 , , , , ,	47,515,685	66 6	
6	46 , , , , ,	46,437,231	56 2	58 5
1	45 , , , , ,	45,893,369	39 4	

There is nothing in this table to encourage farther inquiry in this direction. The correspondence of the lowest revenue with the lowest price in the single year 1835, the moderate difference between the prices in this year and in the two years at the head of the table (47*s.* 3*d.* — 39*s.* 4*d.* = 7*s.* 11*d.*), between which the difference in the revenue amounts to nearly eight millions, and the analogous results obtained when the nine groups are reduced to three, preclude all expectation of a result in favour of low prices being obtained by the grouping together of a smaller number of years than the fifteen years already contrasted with each other. The negative result, therefore, exhibited in this table, again throws a doubt upon the conclusion in favour of low prices as a cause of a flourishing revenue, which the figures in Tables IV., V., and VI., seemed to have established.

In searching after other modes of throwing light upon this interesting question, it naturally occurs to me to inquire, 1st, whether, in years of equal, or nearly equal, average prices of wheat, the revenue was of the same, or nearly the same, amount; and 2nd, whether, in a series of years, during which the price of wheat progressively rose or fell, the revenue fell or rose.

In answering the first of these questions, it is not necessary to resort to a formal tabular arrangement. Suffice it to observe that a single glance at Table III. will serve to show that, for prices of wheat differing only by a few pence, we have very striking variations in the revenue. Thus, in the four years 1825, 1829, 1831, and 1840, when the price of wheat ranged from 66*s.* 3*d.* to 66*s.* 6*d.*, the revenue ranged from 46 millions to 52 millions; while the year 1835, when the price of wheat was 39*s.* 4*d.* and the revenue nearly 46 millions, holds an intermediate position between the year 1850, when the price of wheat was 40*s.* 3*d.* and the revenue upwards of 52 millions, and the year 1851, when the price of wheat being 38*s.* 5*d.*, the revenue was more than 51½ millions. These comparisons, again, are not favourable to the theory of a very close relation existing between the price of wheat and the revenue.

The second question—whether in a series of years, during which the price of wheat progressively rose or fell, the revenue fell or rose—cannot be so readily answered without having recourse to tabular arrangement.

To understand the full force of the following tabular comparisons, it is necessary to call to mind that the theoretic assertion which we are now examining, is this, that a low price of food tends to bring about a flourishing state of the revenue. If, then, this theory be well founded, the revenue ought to increase as prices fall, and decrease as prices rise. It will be seen that the table consists of eight cycles of years, four of rising and four of falling prices, three of the cycles comprising three, one four, and four five years. The range of prices in the several cycles, the amount of the revenue in the first and last years of each cycle, and the difference whether in the way of increase or decrease, are presented in distinct columns.

In order also to render the result of these comparisons more apparent, the figures which contradict the theory are characterised by an asterisk.

TABLE VIII.
Prices Rising.

	Year.	Revenue.
<i>Four Years—1822 to 1825.</i>		£
Price of wheat ranging from 43s. 3d. to 66s. 6d.	{ 1822 1825	53,652,473 52,065,390
	Decrease	1,587,083
<i>Three Years—1827 to 1829.</i>		
Price of wheat ranging from 56s. 9d. to 66s. 3d.	{ 1827 1829	49,581,576 50,428,275
	Increase	846,699*
<i>Five Years—1835 to 1839.</i>		
Price of wheat ranging from 39s. 4d. to 70s. 8d.	{ 1835 1839	45,893,369 47,688,910
	Increase	1,795,541*
<i>Three Years—1845 to 1847.</i>		
Price of wheat ranging from 50s. 10d. to 69s. 9d.	{ 1845 1847	51,719,118 51,340,801
	Decrease	378,317

Prices Falling.

<i>Three Years—1825 to 1827.</i>		
Price of wheat ranging from 66s. 6d. to 56s. 9d.	{ 1825 1827	52,065,390 49,581,576
	Decrease	2,483,814*
<i>Five Years—1831 to 1835.</i>		
Price of wheat ranging from 66s. 4d. to 39s. 4d.	{ 1831 1835	46,293,646 45,893,369
	Decrease	400,277*
<i>Five Years—1839 to 1843.</i>		
Price of wheat ranging from 70s. 8d. to 50s. 1d.	{ 1839 1843	47,688,910 51,069,978
	Increase	3,381,068
<i>Five Years—1847 to 1851.</i>		
Price of wheat ranging from 69s. 9d. to 38s. 5d.	{ 1847 1851	51,340,801 51,669,553
	Increase	328,752

The answer which these figures give to the question before us is ambiguous; for, of the four cycles of years of rising prices, two are in accordance with, and two in opposition to, the theory of a direct and

close connection between the price of wheat and the revenue; and it is a very curious coincidence that the four cycles of years of falling prices give precisely the same contradictory results,—two for, and two against the theory. Hence it happens that, taking the cycles of rising and falling prices together, for four cycles confirming the theory there are four cycles invalidating it. So that we are again reduced to that state of uncertainty from which, in this class of inquiries, it is often so difficult to escape.

One more comparison it occurs to me, in this place, to make. In a former communication to the Society,* I presented, in a tabular form, the history of the revenue from 1814 to 1850 inclusive: and combining the two elements of increase or decrease of revenue, and, remission or increase of taxes, I set forth in three distinct columns, the years in which the revenue was restored and a surplus realized; the years in which the revenue was partially restored; and the years in which the revenue was not only not restored, but presented a deficiency. Now, if we characterise these three classes of years as successful, partially successful, and unsuccessful, and ascertain the average prices of wheat in those classes respectively, it is probable that we may succeed in throwing additional light on the question before us. This comparison is made in the following table.

TABLE IX.

	Price of Wheat.	s. d.	
		55	10
11 successful financial years			
7 partially successful financial years		53	7
11 unsuccessful financial years		58	10

It results from this tabular comparison, that though the average price of wheat in the eleven unsuccessful financial years is higher than in the successful and partially successful years, as the theory of a close dependence of the revenue on the price of wheat would require, the price of wheat in the eleven successful financial years is higher, on an average, by more than 2*s.*, than in the seven partially successful years—a result obviously at variance with that theory.

It will be seen that from all the foregoing calculations an element has been omitted, which must of necessity exercise a marked influence on the results. A portion of the revenue (in many years not inconsiderable) is derived from wheat and wheat-flour; and as, generally speaking, that portion is largest when the average price of wheat is high, and smallest when the average price is low, it is clear that the introduction of this element into the revenue returns must tend to modify and obscure very materially the results of all our calculations. In order, therefore, to arrive at the most satisfactory results of which this inquiry is susceptible, it will be necessary to deduct from the revenue of each year that portion which is derived from the duty on wheat and wheat-flour. This deduction is made in Table X. It presents a counterpart to Table III., on which most of the foregoing calculations have been

* "On the Immediate Effect produced on the Revenue by the Remission or Increase of Taxes." Table at p. 154, vol. xv.

founded. The asterisk indicates years in which the returns are limited to Great Britain.

TABLE X.

Years.	Price of Wheat.	Ordinary Revenue.	Receipts from Wheat and Wheat-Flour.	Revenue, less Duties on Wheat, &c.
1839.....	70 8	47,688,910	670,447	47,018,463
1847.....	69 9	51,340,801	3,981	51,336,820
1825.....	66 6	52,065,390	223,399	51,841,991
1831.....	66 4	46,293,646	342,220	45,951,426
1840.....	66 4	47,351,563	896,996	46,454,567
1829.....	66 3	50,428,275	625,224	49,803,051
1838.....	64 7	47,104,745	145,246	46,959,499
1841.....	64 4	47,917,521	431,590	47,485,931
1830.....	64 3	49,889,994	537,662	49,352,332
1824.....	62 0	52,202,018	9,416*	52,192,602
1828.....	60 5	51,665,077	72,826	51,592,251
1832.....	58 8	46,833,796	263,561	46,570,235
1842.....	57 3	46,700,890	1,194,614	45,506,276
1826.....	56 11	49,625,485	177,227	49,448,258
1827.....	56 9	49,581,576	606,521	48,975,055
1837.....	55 10	46,199,190	304,638	45,894,552
1846.....	54 8	52,950,202	595,477	52,354,725
1833.....	52 11	46,170,600	21,956	46,148,644
1823.....	51 9	51,508,376	10,310*	51,498,066
1844.....	51 3	53,317,092	690,560	52,626,532
1845.....	50 10	51,719,118	96,385	51,622,733
1848.....	50 6	52,422,338	456,093	51,966,245
1843.....	50 1	51,069,978	624,775	50,445,203
1836.....	48 6	48,591,180	8,591	48,582,589
1834.....	46 2	46,425,263	17,087	46,408,176
1849.....	44 3	52,310,768	296,025	52,014,743
1822.....	43 3	53,652,473	Nil.	53,652,473
1850.....	40 3	52,177,141	261,532	51,915,609
1835.....	39 4	45,893,369	7,715	45,885,654
1851.....	38 5	51,669,553	290,437	51,379,116

The following table constructed with the aid of the materials contained in Table X., forms, in like manner, the counterpart to Table IV. It presents the revenue in the same groups of dear and cheap years, and the differences between the average results, together with the prices of wheat in the same groups.

TABLE XI.

Number of Years.	Dear Years.		Cheap Years.		Average Difference in favour of Cheap Years.
	Average Price of Wheat.	Average Ordinary Revenue.	Average Price of Wheat.	Average Ordinary Revenue.	
15	63 5	48,629,350	47 10	50,359,671	1,730,321
12	65 0	48,879,931	46 5	50,666,428	1,786,497
10	66 1	48,839,668	45 2	50,387,254	1,547,586
7	67 2	47,052,259	42 11	49,976,909	2,924,650
5	67 11	48,520,653	41 1	50,969,519	2,448,866
3	69 0	50,065,758	39 4	49,726,793	338,965*

The influence of the correction applied to the figures of Table IV., shows itself in this table in the manner that might have been anticipated. The correction enhances the difference between the average revenue of the groups of dear and cheap years in all those instances (five out of six) in which the figures in Table IV. were in harmony with the theory now under examination, while it diminishes the amount of difference in the small group of three years which formed the exception to the rule. When we consider that even in extreme cases the portion of the revenue derived from wheat and wheat-flour forms scarcely a fortieth part of the entire ordinary revenue, and that the amount of wheat and wheat-flour imported, and of duty received, by no means corresponds with the average price of wheat, but bears only a very general relation to it, the correction introduced into Table IV. by the abstraction from the ordinary revenue of the amount of duty on wheat and wheat-flour is fully as great as might have been anticipated. Let us now see what will be the effect of this correction on the numerical results of Table V., which shows the average revenue for groups of years when the year following a given average price of wheat is substituted for the year in which that average occurs.

TABLE XII.

Number of Years.	Dear Years.		Cheap Years.		Difference in Price of Wheat.	Annual Excess of Ordinary Revenue in Cheap Years.	Annual Excess of Ordinary Revenue in Cheap Years per shilling of Price.
	Average Price of Wheat.	Average Ordinary Revenue.	Average Price of Wheat.	Average Ordinary Revenue.			
14	63 10	48,354,834	48 6	50,047,958	15 4	1,693,123	112,875
12	65 0	48,128,952	47 5	50,197,925	17 7	2,068,973	114,943
10	66 1	48,159,572	46 5	50,377,432	19 8	2,217,860	110,893
7	67 2	48,328,004	44 7	49,683,160	22 7	1,355,156	58,920
5	67 11	48,385,047	42 8	49,852,207	25 3	1,467,160	58,686
3	69 0	49,289,690	40 11	50,486,590	28 1	1,196,900	42,746

A comparison of this table with Table V. shows that here too the correction which has been applied, has the effect of bringing out, more strikingly than before, the beneficial influence on the revenue of a low price of wheat. It will be observed that in every line of the table the influence of this correction makes itself felt.

Following still the same course of examination already adopted, let us next inquire what effect the correction we are applying has upon the converse of the proposition, that a low price of wheat implies a favourable state of the revenue. The following table is a counterpart of Table VI.

TABLE XIII.

14 Years above 50 Millions.			16 Years below 50 Millions.			Difference.
Price of Wheat.	Ordinary Revenue.	Price of Wheat.	Ordinary Revenue.			
s. d.	£	s. d.	£			
52 5	51,888,508	58 5	47,277,794			4,610,714

Here, too, the influence of the correction makes itself felt, though scarcely to such an extent as to encourage the expectation of any material difference between the following table and Table VII., in each of which the price of wheat corresponding with different amounts of revenue is pursued more into detail.

TABLE XIV.

Number of Years.	Average Ordinary Revenue.			Average Price of Wheat.	
		£		s. d.	s. d.
1	Above 53 millions	53,652,473		43 3	
4	52 and less than 53 millions	52,297,150		53 0	52 7
8	51 , , , 52 , , , 53	51,644,104		53 7	
1	50 , , , 51 , , , 52	50,445,203		50 1	
3	49 , , , 50 , , , 51	49,534,547		62 6	57 1
2	48 , , , 49 , , , 50	48,778,817		52 7	
2	47 , , , 48 , , , 49	47,252,197		67 6	
5	46 , , , 47 , , , 48	46,508,224		57 8	58 4
4	45 , , , 46 , , , 47	45,809,477		54 8	

A general tendency to low prices of wheat in years of large revenue, and of high prices of wheat in years of small revenue, is all the result to which this table conducts us. The table is too much broken up into small groups of years to yield a very marked result; but when arranged into three larger groups, we obtain the ascending scale of prices, 52s. 7d., 57s. 1d., and 58s. 4d., corresponding to the falling scale of revenue, from 51-53, to 48-50, and 45-47 millions. So that here again the correction we are now employing produces a result more in accordance with the theory which ascribes to the price of wheat a marked influence on the revenue.

The next class of calculations into which it is proposed to carry

the correction now under consideration, is that relating to rising and falling prices, as displayed in Table VIII., of which the following table is a counterpart.

TABLE XV.
Prices Rising.

	Year.	Revenue.
<i>Four Years—1822 to 1825.</i>		£
Price of wheat ranging from 43s. 3d. to 66s. 6d.	{ 1822 1825	53,652,473 51,841,991
	Decrease	1,810,482
<i>Three Years—1827 to 1829.</i>		
Price of wheat ranging from 56s. 9d. to 66s. 3d.	{ 1827 1829	48,975,055 49,803,051
	Increase	827,996*
<i>Five Years—1835 to 1839.</i>		
Price of wheat ranging from 39s. 4d. to 70s. 8d.	{ 1835 1839	45,885,654 47,018,463
	Increase	1,132,809*
<i>Three Years—1845 to 1847.</i>		
Price of wheat ranging from 50s. 10d. to 69s. 9d.	{ 1845 1847	51,622,733 51,336,820
	Decrease	285,913

Prices Falling.

<i>Three Years—1825 to 1827.</i>		
Price of wheat ranging from 66s. 6d. to 56s. 9d.	{ 1825 1827	51,841,991 48,975,055
	Decrease	2,866,936*
<i>Five Years—1831 to 1835.</i>		
Price of wheat ranging from 66s. 4d. to 39s. 4d.	{ 1831 1835	45,951,426 45,885,654
	Decrease	65,772*
<i>Five Years—1839 to 1843.</i>		
Price of wheat ranging from 70s. 8d. to 50s. 1d.	{ 1839 1843	47,018,463 50,445,203
	Increase	3,426,740
<i>Five Years—1847 to 1851.</i>		
Price of wheat ranging from 69s. 9d. to 38s. 5d.	{ 1847 1851	51,336,820 51,379,116
	Increase	42,296

In this case the introduction of the correction so often referred to, makes no alteration in the general result of the uncorrected table (Table VIII.) The answer afforded by both tables is uncertain, the results in conformity with the theory being counteracted by just as many results in opposition to it.

This inquiry will certainly disappoint those who think that the price of wheat has a very decided effect upon the revenue. Had such a decided effect existed, it would have certainly displayed itself in the tables contained in this communication. But it has been seen, that while some of these tables yield no response at all, others give very feeble and unsteady indications of a relation existing between the price of wheat and the revenue. Among the tables which give an uncertain response, the most striking are Tables VIII. and XV., in which four positive are neutralized by four negative results, and the increase or decrease of revenue bears no steady ratio to the fall or rise of price. Tables VI. and VII., and Tables XIII. and XIV. again, though they certainly do speak a less doubtful language, exhibit for great differences of revenue, very small differences of price, a difference of about three millions of revenue corresponding to a difference of little more than a shilling in price. (See Table XIV.) The language of Tables IV. and XI. again is more decided, as all the larger groups of years, from 15 years down to 5 years, show results in conformity with the theory that the price of wheat has a marked influence on the revenue. The only exception to the rule is in the case of the small group of three years. But it will be observed that there is no exact relation between difference of revenue and difference of price. The excess of revenue in the cheap years does not uniformly increase with the divergence of the prices of wheat. Tables V. and XII., however, are those which yield the most decisive results. They contrast the prices of wheat in groups of dear and cheap years with the revenue in the years immediately following such prices, and they show a uniform excess of revenue in all the groups of cheap years over the same number of dear years. But Table IX., which gives the prices of wheat in the three groups of successful, partially successful, and unsuccessful financial years, again suggests a doubt of the influence of the price of wheat on the revenue; for though the unsuccessful financial years correspond with the highest average price of wheat, the partially successful years are years of lower price than the wholly successful years. This leads me back to the tables with which I opened this communication, and which, as I have already intimated, gave occasion to the strongly expressed opinion of the late Mr. Porter, on the influence of the price of wheat on the revenue. A glance at Table II. will serve to show that the influence in question is too weak to overcome certain strong conflicting agencies; for though, in common with the table last referred to, the unsuccessful financial periods do certainly correspond with the highest prices of wheat, the most prosperous financial periods are not those of the lowest prices; for of four prosperous quinquennial periods, the two most prosperous correspond to the highest prices, and the two least prosperous to the lowest prices; while the least prosperous of the two prosperous decennial periods corresponds with a price of wheat exceeding by nearly 9s. the price in the most successful financial period of the same duration.

The results of this inquiry may be briefly summed up in the following propositions.

1. The influence of the price of wheat on the revenue is not such as to establish a very close and uniform relation between the one and the other; for equal prices of wheat do not coincide with equal amounts of revenue, nor equal amounts of revenue with equal prices of wheat, while cycles of years of rising and falling prices are found to correspond with diminishing and increasing amounts of revenue indifferently; and even those numerical results which seem to indicate the closest relation between the price of wheat and the revenue, display exceptions and irregularities which tend to impair the evidence they afford.

2. A comparison of groups of years of high and of low prices of wheat, issues in a result highly favourable to the theory that the price of wheat exercises a marked influence on the revenue, and this is especially the case when the years immediately following those of high or of low prices are substituted for the years coinciding with them.

3. The result of these comparisons is rendered still more striking when that portion of the revenue which is derived from wheat and wheat-flour, is subtracted from the total net ordinary revenue; and this correction has, at the same time, the effect of diminishing the amount of the irregularities just referred to.

4. When, however, the amount of the revenue in different years is subjected to the necessary correction of taxes imposed or reduced, and the years of successful or unsuccessful financial operations are compared with the price of wheat, the results are again rendered fluctuating and irregular, the injurious effect of a very high price being more apparent than the favourable effect of a very low price.

5. If we could, safely assume the relation between the price of wheat and the revenue in the year following, to be the true relation, then the measure of that relation would be, in round numbers, 42,746*l.* to 114,943*l.* of revenue for every rise or fall of one shilling in the price of wheat. (Table XII.)

On a careful and dispassionate review of the results of the inquiry in which we have been engaged, it will appear that the relation of the price of wheat to the revenue is one of a large class of subjects with which the statesman and the physician are equally familiar. A vast variety of distinct agencies are found conducing to one result, but some one agency to which it is reasonable to attach considerable importance, struggles, so to speak, to make itself appreciated against other influences which obscure its operation either by working more powerfully in the same direction, or by directly counteracting it. Hence some of our most promising inquiries yield only negative results, and others give but a very uncertain response, and the methods of the statistic have to bear the blame which should attach to the objects of his inquiry.

In the case of this particular inquiry into the relation of the price of wheat to the revenue, it should also be borne in mind that in addition to sources of difficulty and of fallacy inherent in the complicated workings of the human frame or of the body politic, the objects of study to the physician and statesman respectively, there is this peculiar source of difficulty, that the revenue of the country, instead of being subject

to fluctuation from external causes only, is liable to the most sudden and capricious reforms and revolutions at the hands of the legislature. Thus, during the last thirty years over which this inquiry extends, scarcely a year has elapsed that the revenue has not been disturbed by the reduction and repeal of old taxes, or the increase and imposition of new ones, or by the more complicated operation of a contemporaneous increase and reduction of imposts; while the prices of wheat and of wheat-meal have been subject to disturbance by no less than seven distinct Acts of parliament.*

This inquiry also serves to illustrate the nature of some of the fallacies which attach to statistical investigations. Take for example the numerical results displayed in Tables VIII. and XV.: if one or more of the cycles of years of rising or falling prices which correspond to an increasing or decreasing revenue had been selected to the exclusion of the remainder, the results would have seemed to justify the assertion that a low price of wheat has an injurious effect on the revenue, and conversely, if the opposite class of cycles were selected. Assuming the selection to have been made in good faith, and by mere omission, error would have honestly crept in: if by bad faith, the proverb "that anything may be proved by figures," would have received an apt illustration. But if it had happened that the comparison of the prices of wheat and the revenue in cycles of years of rising and of falling prices had presented itself to the mind of the inquirer as an all-sufficient means of determining the true relation of the price of wheat to the revenue, he would have arrived at a conclusion, which this more extensive and complete investigation certainly does not warrant, that the price of wheat has no relation whatever to the state of the national finances.

As everything which throws light upon the nature of the difficulties and fallacies which attach to statistical inquiries is interesting and instructive, I cannot resist the temptation of introducing in this place, in two extreme cases, the additional element of the exports; and I will state the facts in round numbers, so as to produce the greatest possible effect.

1. In the year 1822, the price of wheat was 43*s.*, the revenue 53½ millions, and the exports 37 millions. During the three following years the price of wheat rose progressively till, in the year 1825, it had reached 66*s.*, the revenue being 52 millions, and the exports 39 millions. The reduction of taxation in the same period exceeded 11 millions. So that in these four years, from 1822 to 1825 inclusive, the exports increased 2 millions, and the revenue, in spite of a reduction of taxation exceeding 11 millions, suffered only to the extent of 1½ millions, the price of wheat, at the same time, progressively rising from 43*s.* to 66*s.*

2. In the year 1835, the average price of wheat was 39*s.*, the revenue 46 millions, and the declared value of the exports 47 millions. During the four following years the price of wheat rose progressively till, in 1839, it reached 71*s.*, the revenue in the same year being 48 millions, and the exports 53 millions. In this interval, from 1835 to 1839, taxes were repealed to the amount of more than one million.

* Those of 1822, 1825, 1826, 1827, 1828, 1842, and 1846.

So that in these five years, from 1835 to 1839 inclusive, the exports increased 6 millions, and the revenue, in spite of a reduction of more than a million in taxes, increased 2 millions, the price of wheat, at the same time, progressively rising from 39*s.* to 71*s.*

In bringing this communication to a close, I cannot but regret that so interesting and promising an inquiry has not yielded results more decided and more uniform; but I have the satisfaction of believing that this is due rather to the inherent difficulty of the subject itself, than to either the employment of unsound methods of investigation, or the omission of any reasonable mode of arriving at the truth.

A P P E N D I X.

The following table, which gives the price of wheat and the ordinary revenue for each year from 1822 to 1851, has been constantly used in compiling the tables contained in the foregoing communication; and, as it promises to be useful for purposes other than those for which it is here employed, it has been thought desirable to append it.

Table showing the average Price of Wheat and the Ordinary Revenue for each year, from 1822 to 1851 inclusive.

Year.	Price of Wheat.	Ordinary Revenue.	Year.	Price of Wheat.	Ordinary Revenue.		
s.	d.	£		s.	d.	£	
1822.....	43	3	53,652,473	1837.....	55	10	46,199,190
1823.....	51	9	51,508,376	1838.....	64	7	47,104,745
1824.....	62	0	52,202,018	1839.....	70	8	47,688,910
1825.....	66	6	52,065,390	1840.....	66	4	47,351,563
1826.....	56	11	49,625,485	1841.....	64	4	47,917,521
1827.....	56	9	49,581,576	1842.....	57	3	46,700,890
1828.....	60	5	51,665,077	1843.....	50	1	51,069,978
1829.....	66	3	50,428,275	1844.....	51	3	53,317,092
1830.....	64	3	49,889,994	1845.....	50	10	51,719,118
1831.....	66	4	46,293,646	1846.....	54	8	52,950,202
1832.....	58	8	46,833,796	1847.....	69	9	51,340,801
1833.....	52	11	46,170,600	1848.....	50	6	52,422,338
1834.....	46	2	46,425,263	1849.....	44	3	52,310,768
1835.....	39	4	45,893,369	1850.....	40	3	52,177,141
1836.....	48	6	48,591,180	1851.....	38	5	51,669,553
